

WHAT IS CLAIMED IS:

1           1.     A method for monitoring depletion of a consumable resource in a  
2 monitored system, comprising:  
3           receiving information on at least one unit of work to be processed by the  
4 monitored system, wherein the monitored system would deplete the consumable resource  
5 when processing each unit of work;  
6           determining a rate of resource depletion per unit of work processed;  
7           estimating an amount of resource remaining after the monitored system processes  
8 the at least one unit of work, wherein the estimate is a function of the determined rate of  
9 resource depletion and a number of the one or more units of work to process; and  
10          generating a graphical element for display on a computer monitor indicating the  
11 estimated amount of the resource remaining.

1           2.     The method of claim 1, wherein the graphical display comprises a  
2 graphical gauge displaying a range of values from zero to a maximum capacity of the  
3 consumable resource in the monitored system, wherein the estimated amount of the  
4 resource remaining is indicated on the gauge.

1           3.     The method of claim 2, wherein indicating the estimated amount of the  
2 resource remaining on the gauge comprises displaying a graphical needle on the gauge  
3 pointing to a position on the gauge indicating the estimated amount of the resource  
4 remaining.

1           4.     The method of claim 1, further comprising:  
2           estimating a number of units of work that can be processed with the estimated  
3 amount of the resource remaining; and  
4           generating information to display with the generated graphical element indicating  
5 the estimated number of units of work.

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1           5.     The method of claim 1, further comprising:  
2           receiving notification that the consumable resource is depleted in the monitored  
3     system; and  
4           determining an adjustment factor if the estimated amount of resource remaining is  
5     not estimated to be depleted, wherein the adjustment factor is applied when estimating  
6     the amount of resource remaining during use of the monitored system after the  
7     consumable resource is replenished in the monitored system.

1           6.     The method of claim 1, further comprising:  
2           after the consumable resource is fully replenished, initializing the estimated  
3     amount of resource remaining to full capacity, wherein estimating the amount of resource  
4     remaining comprises:

5                 (i) multiplying the number of one or more units of work to process times  
6                 the rate of resource depletion to estimate an amount of resource depletion that  
7                 results from processing the at least one unit of work; and

8                 (ii) setting the estimated amount of resource remaining to the estimated  
9     amount of resource remaining minus the estimated amount of resource depletion.

1           7.     The method of claim 1, further comprising:  
2           determining whether the estimated amount of the resource remaining indicates  
3     that the consumable resource is depleted in the monitored system; and  
4           generating a message indicating that there is not a sufficient amount of resource  
5     remaining to process the at least one unit of work if the resource is determined to be  
6     depleted in the monitored system.

1           8.     The method of claim 1, wherein multiple systems are monitored, wherein  
2     the estimated amount of resource remaining is determined for each monitored system,  
3     and at least one graphical element is displayed on the computer monitor for each

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4 determining a material composition of the consumable resource in the printer; and

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1           15.     The method of claim 9, further comprising:  
2           determining whether the estimated amount of the resource remaining indicates  
3     that the consumable resource is depleted in the monitored printer; and  
4           generating a message indicating that there is not a sufficient amount of the  
5     resource remaining to process the number of pages in the print job if the resource is  
6     determined to be depleted in the monitored system.

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1 16. The method of claim 9, further comprising:  
2 determining at least one attribute of the print job; and  
3 determining one attribute factor for each determined attribute of the print job,  
4 wherein the determined at least one attribute factor is used to estimate the amount of the  
5 resource remaining.

1 17. The method of claim 16, wherein the consumable resource comprises  
2 toner and wherein the determined attributes of the print job include contrast and boldness.

1 18. The method of claim 17, further comprising:  
2 providing a contrast table and boldness table providing different contrast and  
3 boldness factors, respectively, for different contrast and boldness settings.

1 19. The method of claim 9, wherein the graphical display comprises a  
2 graphical gauge displaying a range of values from zero to a maximum capacity of the  
3 consumable resource in the monitored system, wherein the estimated amount of the  
4 consumable resource remaining is indicated on the gauge.

1 20. The method of claim 19, wherein the printer is a color printer, and wherein  
2 resource depletion is monitored for multiple color toners used in the monitored printer,  
3 wherein one gauge is displayed for each color toner in the printer

1 21. The method of claim 19, wherein the consumable resource is monitored at  
2 multiple printers and the amount of resource remaining is estimated for each monitored  
3 printer, further comprising displaying one graphical gauge indicating the estimated  
4 amount of the resource remaining for each monitored printer.

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1            25.     The system of claim 24, wherein the graphical display comprises a  
2   graphical gauge displaying a range of values from zero to a maximum capacity of the

3 consumable resource in the monitored system, wherein the estimated amount of the  
4 resource remaining is indicated on the gauge.

1 26. The system of claim 24, wherein the processing unit further includes:  
2 means for receiving notification that the consumable resource is depleted in the  
3 monitored system; and  
4 means for determining an adjustment factor if the estimated amount of resource  
5 remaining is not estimated to be depleted, wherein the adjustment factor is applied when  
6 estimating the amount of resource remaining during use of the monitored system after the  
7 consumable resource is replenished in the monitored system.

1 27. The system of claim 24, further comprising:  
2 multiple systems using the consumable resource;  
3 wherein the processing unit is in communication with the multiple systems, and  
4 wherein the processing unit further includes:  
5 (i) means for monitoring the multiple systems;  
6 (ii) means for determining the estimated amount of resource remaining for  
7 each monitored system; and  
8 (iii) means for displaying at least one graphical element on the computer  
9 monitor for each monitored system indicating the estimated amount of the  
10 resource remaining for the monitored system.

1 28. A system for monitoring depletion of a consumable resource, comprising:  
2 (a) a printer; and  
3 (c) a computer monitor; and  
4 (b) a processing unit in communication with the printer and the computer monitor,  
5 comprising:

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- 6 (i) means for receiving a print job having print matter for at least one  
7 page;  
8 determining a rate of resource depletion per page;  
9 (ii) means for estimating an amount of resource remaining after the printer  
10 processes the print job as a function of a number of the at least one page in the  
11 print job and the determined rate of resource depletion; and  
12 (iii) means for generating a graphical element for display on a computer  
13 monitor indicating the estimated amount of the resource remaining.

1 29. The system of claim 28, wherein the processing unit further comprises:  
2 means for providing a data structure indicating one rate of resource depletion for  
3 different printers; and  
4 means for determining an identifier of the printer to print the print job, wherein  
5 determining the rate of resource depletion comprises determining the rate of resource  
6 depletion in the data structure corresponding to the determined identifier of the printer.

1 30. The system of claim 28, wherein the data structure provides rate of  
2 resource depletions for different material compositions used for the consumable resource,  
3 wherein the means for determining the rate of resource depletion further performs:  
4 determining a material composition of the consumable resource in the printer; and  
5 determining the rate of resource depletion in the data structure for the determined  
6 material composition.

1 31. The system of claim 28, wherein the processing unit further comprises:  
2 means for receiving notification from the printer that the consumable resource is  
3 depleted in the monitored printer; and  
4 means for determining an adjustment factor if the estimated amount of resource  
5 remaining is not estimated to be depleted, wherein the adjustment factor is applied when

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6 estimating the amount of resource remaining during use of the monitored printer after the  
7 consumable resource is replenished in the printer.

1 32. The system of claim 28, wherein the processing unit further includes:  
2 means for determining at least one attribute of the print job; and  
3 means for determining one attribute factor for each determined attribute of the  
4 print job, wherein the determined at least one attribute factor is used to estimate the  
5 amount of the resource remaining.

1 33. The system of claim 28, wherein the graphical display comprises a  
2 graphical gauge displaying a range of values from zero to a maximum capacity of the  
3 consumable resource in the monitored system, wherein the estimated amount of the  
4 consumable resource remaining is indicated on the gauge.

1 34. The system of claim 33, wherein the printer is a color printer, and wherein  
2 resource depletion is monitored for multiple color toners used in the monitored printer,  
3 wherein one gauge is displayed for each color toner in the printer

1 35. The method of claim 33, wherein the consumable resource is monitored at  
2 multiple printers and the amount of resource remaining is estimated for each monitored  
3 printer, further comprising displaying one graphical gauge indicating the estimated  
4 amount of the resource remaining for each monitored printer.

1 36. An article of manufacture including code method for monitoring depletion  
2 of a consumable resource in a monitored system and displaying information on a  
3 computer monitor, wherein the code causes operations to be performed comprising:

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1            39.     The article of manufacture of claim 36, further comprising:  
2            estimating a number of units of work that can be processed with the estimated  
3            amount of the resource remaining; and  
4            generating information to display with the generated graphical element indicating  
5            the estimated number of units of work.

1 40. The article of manufacture of claim 36, further comprising:  
2 receiving notification that the consumable resource is depleted in the monitored  
3 system; and  
4 determining an adjustment factor if the estimated amount of resource remaining is  
5 not estimated to be depleted, wherein the adjustment factor is applied when estimating  
6 the amount of resource remaining during use of the monitored system after the  
7 consumable resource is replenished in the monitored system.

1 41. The article of manufacture of claim 36, further comprising:  
2 after the consumable resource is fully replenished, initializing the estimated  
3 amount of resource remaining to full capacity, wherein estimating the amount of resource  
4 remaining comprises:

5 (i) multiplying the number of one or more units of work to process times  
6 the rate of resource depletion to estimate an amount of resource depletion that  
7 results from processing the at least one unit of work; and

8 (ii) setting the estimated amount of resource remaining to the estimated  
9 amount of resource remaining minus the estimated amount of resource depletion.

1 42. The article of manufacture of claim 36, further comprising:  
2 determining whether the estimated amount of the resource remaining indicates  
3 that the consumable resource is depleted in the monitored system; and  
4 generating a message indicating that there is not a sufficient amount of resource  
5 remaining to process the at least one unit of work if the resource is determined to be  
6 depleted in the monitored system.

1 43. The article of manufacture of claim 36, wherein multiple systems are  
2 monitored, wherein the estimated amount of resource remaining is determined for each  
3 monitored system, and at least one graphical element is displayed on the computer

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4 monitor for each monitored system indicating the estimated amount of the resource  
5 remaining for the monitored system.

1           44     An article of manufacture including code for monitoring depletion of a  
2 consumable resource in a printer, wherein the code causes operations to be performed  
3 comprising:  
4           receiving a print job having print matter for at least one page;  
5           determining a rate of resource depletion per page;  
6           estimating an amount of resource remaining after the printer processes the print  
7 job as a function of a number of the at least one page in the print job and the determined  
8 rate of resource depletion; and  
9           generating a graphical element for display on a computer monitor indicating the  
10 estimated amount of the resource remaining.

1           45.     The article of manufacture of claim 44, further comprising:  
2           providing a data structure indicating one rate of resource depletion for different  
3 printers; and  
4           determining an identifier of the printer to print the print job, wherein determining  
5 the rate of resource depletion comprises determining the rate of resource depletion in the  
6 data structure corresponding to the determined identifier of the printer.

1           46.     The article of manufacture of claim 45, wherein the identifier of the  
2 printer comprises one of a printer model and a unique name of the printer that will  
3 process the print job.

1           47.     The article of manufacture of claim 45, wherein the data structure  
2 provides rate of resource depletions for different material compositions used for the

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3 consumable resource, wherein determining the rate of resource depletion further  
4 comprises:

5 determining a material composition of the consumable resource in the printer; and  
6 determining the rate of resource depletion in the data structure for the determined  
7 material composition.

1 48. The article of manufacture of claim 44, further comprising:  
2 receiving notification from the printer that the consumable resource is depleted in  
3 the monitored printer; and

4 determining an adjustment factor if the estimated amount of resource remaining is  
5 not estimated to be depleted, wherein the adjustment factor is applied when estimating  
6 the amount of resource remaining during use of the monitored printer after the  
7 consumable resource is replenished in the printer.

1 49. The article of manufacture of claim 44, further comprising:  
2 after the consumable resource is fully replenished, initializing the amount of  
3 resource remaining to full capacity, wherein estimating the amount of resource remaining  
4 comprises:

5 (i) multiplying the number of pages in the print job times the determined  
6 rate of resource depletion to estimate an amount of resource depletion from at the  
7 printer when processing the print job; and

8 (ii) setting the estimated amount of resource remaining to the estimated  
9 amount of resource remaining minus the estimated amount of resource depletion.

1 50. The article of manufacture of claim 44, further comprising:  
2 determining whether the estimated amount of the resource remaining indicates  
3 that the consumable resource is depleted in the monitored printer; and

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4 generating a message indicating that there is not a sufficient amount of the  
5 resource remaining to process the number of pages in the print job if the resource is  
6 determined to be depleted in the monitored system.

1 51. The article of manufacture of claim 44, further comprising:  
2 determining at least one attribute of the print job; and  
3 determining one attribute factor for each determined attribute of the print job,  
4 wherein the determined at least one attribute factor is used to estimate the amount of the  
5 resource remaining.

1 52. The article of manufacture of claim 51, wherein the consumable resource  
2 comprises toner and wherein the determined attributes of the print job include contrast  
3 and boldness.

1 53. The article of manufacture of claim 52, further comprising:  
2 providing a contrast table and boldness table providing different contrast and  
3 boldness factors, respectively, for different contrast and boldness settings.

1 54. The method of claim 9, wherein the graphical display comprises a  
2 graphical gauge displaying a range of values from zero to a maximum capacity of the  
3 consumable resource in the monitored system, wherein the estimated amount of the  
4 consumable resource remaining is indicated on the gauge.

1 55. The method of claim 54, wherein the printer is a color printer, and wherein  
2 resource depletion is monitored for multiple color toners used in the monitored printer,  
3 wherein one gauge is displayed for each color toner in the printer

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1           56.    The article of manufacture of claim 54, wherein the consumable resource  
2 is monitored at multiple printers and the amount of resource remaining is estimated for  
3 each monitored printer, further comprising displaying one graphical gauge indicating the  
4 estimated amount of the resource remaining for each monitored printer.

1           57.    The article of manufacture of claim 44, further comprising:  
2           estimating a number of pages that can be processed with the estimated amount of  
3 the resource remaining; and  
4           generating information to display with the generated graphical element indicating  
5 the estimated number of pages.

1           58.    The article of manufacture of claim 44, wherein the monitored  
2 consumable resource is one of toner and fuser oil.

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